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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/917,854      | 07/31/2001  | Kunihiro Tsubosaki   | DAIN: 644           | 2156             |

7590

02/28/2003

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Alexandria, VA 22314-2805

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| EXAMINER |
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ERDEM, FAZLI

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2826

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/917,854

Applicant(s)

TSUBOSAKI, KUNIHIO

Examiner

Fazli Erdem

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.138(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-4, 6 and 16 are rejected under 35 U.S.C. 102(a) as being unpatentable over Chakravorty (6,181,569) in view of Takao et al. (US 2002/0096757) further in view of Muramatsu et al. (6,420,664) further in view of Nukiwa et al. (6,396,155)

Regarding Claim 1, Chakravorty shows a low cost chip size package and method of fabricating the same in which the Figs. 6 and 8 show a semiconductor chip 302 having a contact pad 304, a dielectric layer 305 formed on the surface of the semiconductor chip, metal layers 307 and 310 formed on the insulating layer, and the bumps 311 connected to the pad through metal layers.

Regarding Claim 2, 311 are the bumps

Regarding Claims 3 and 4, Chakrovarty teach the usage of cured conductive bumps in relation to bumps 311.

Regarding Claim 6, Figs. 6 and 8 show two different insulating/dielectric layers.

Chakravorty does not disclose the required connection member configuration having the required shape and area of contact. However, Takao et al. disclose semiconductor device and method of manufacturing the same with the required connection member configuration.

Furthermore, Muramatsu et al. disclose a metal foil having bumps, circuit substrate having the metal foil and semiconductor device having the circuit substrate where the required shape is disclosed. Nukiwa et al. disclose a semiconductor device and method of producing the same where the required area of contact structure is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required connection member structure, shape and area of contact structures in Chakravorty as taught by Takao et al., Muramatsu et al., and Nukiwa et al. respectively in order to have a semiconductor package with better reliability.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravorty (6,350,668) in view of Inaba et al. (6,387,734) further in view of Takao et al. (US 2002/0096757) further in view of Muramatsu et al. (6,420,664) further in view of Nukiwa et al. (6,396,155).

Regarding Claim 5, Inaba et al. disclose the missing solder resist layer. Chakravorty and Inaba et al. combination do not disclose the required connection member configuration having the required shape and area of contact. However, Takao et al. disclose semiconductor device and method of manufacturing the same with the required connection member configuration.

Furthermore, Muramatsu et al. disclose a metal foil having bumps, circuit substrate having the metal foil and semiconductor device having the circuit substrate where the required shape is disclosed. Nukiwa et al. disclose a semiconductor device and method of producing the same where the required area of contact structure is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required connection member structure, shape and area of contact structures in Chakravorty and Inaba combination as taught by Takao et al., Muramatsu et

al., and Nukiwa et al. respectively in order to have a semiconductor package with better reliability.

3. Claims 7-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inaba et al. (66,387,734) in view of Chakravorty (6,350,668) further in view of Takao et al. (US 2002/0096757) further in view of Muramatsu et al. (6,420,664) further in view of Nukiwa et al. (6,396,155) ..

Regarding Claim 7, Inaba et al. show all the claimed subject matter of method of making semiconductor device except it fails to show the forming of individual semiconductor chips step. However, Chakravorty et al. show the method of forming individual chips out of the wafer step.

Regarding Claim 8, Inaba et al. show the solder resist formation.

Regarding Claim 9, Chakravorty shows the different bonding methods including wire bonding.

Regarding Claim 10, Chakravorty shows the subject matter related to cured conductive paste.

Regarding Claim 11, both Inaba et al. and Chakravorty show the metal deposition method of sputtering.

Regarding Claims 12 and 13, both Inaba et al. and Chakravorty show the electroless and electrolytic plating methods.

Regarding Claims 14 and 15 Inaba et al. show the subject matter related to roughness and the photosensitive resin.

Inaba et al. and Chakravorty combination do not disclose the required connection member configuration having the required shape and area of contact. However, Takao et al. disclose semiconductor device and method of manufacturing the same with the required connection member configuration. Furthermore, Muramatsu et al. disclose a metal foil having bumps, circuit substrate having the metal foil and semiconductor device having the circuit substrate where the required shape is disclosed. Nukiwa et al. disclose a semiconductor device and method of producing the same where the required area of contact structure is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required connection member structure, shape and area of contact structures in Inaba et al. and Chakravorty combination as taught by Takao et al., Muramatsu et al., and Nukiwa et al. respectively in order to make a semiconductor package with better reliability.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (703) 305-3868. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

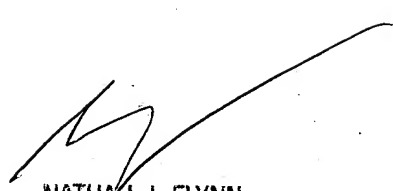
FE  
February 24, 2003

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Application/Control Number: 09/917,854

Page 7

Art Unit: 2826



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